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Volume XXXI October. 1955 No. 4

THE NORTH AMERICAN ANDRENINE BEES OF THE SUBGENUS MELANDRENA WITH DESCRIPTIONS OF NEW SPECIES

(Hymenoptera: Andrenidae)

E. G. Linsley and J. W. MacSwain[1]

University of California, Berkeley

The following keys, notes, and descriptions are offered primarily to facilitate identification of the several superficial by similar species of *Melandrena* which collect pollen only from flowers of the genus *Oenothera* (Onagraceae) (see following paper by Linsley, MacSwain and Smith, 1955). Locality records are supplemental to those provided by Timberlake (1937) and Linsley (1938). A few specimens in the material before us appear to represent new species other than the ones described below. However, we have not proposed names for them at this time because of inadequate series or lack of pertinent ecological data which might give them special significance.

The species of *Melandrena* are medium-sized to rather large *Andrena* with the integument black (sometimes partially red or tinted with reddish or bluish). The females of most species have black pubescence, most of the males predominantly white. The thorax and propodeum of the females are often coarsely sculptured and the process of the labrum is usually reflexed and emarginate. For a fuller characterization of the group see Lanham (1949).

Key to the Species of Melandrena

Females

1. Metasoma black, sometimes tinted with reddish or bluish.....2
— Metasoma with first three or four segments red, remainder black; dorsum of thorax coarsely punctate, clothed with a few scattered black hairs; pleura sparsely clothed with black hairs. Length about 10 mm. Mesilla Valley, New Mexico.....*prima* Casad[2]

[1] The writers are indebted to P. H. Timberlake for making available for study the extensive series in his collection at the Citrus Experiment Station, University of California, Riverside, A. T. McClay for providing material from the collection of the Department of Entomology and Parasitology, University of California, Davis, and D. F. Hardwick and W. R. Mason for loaning material from the Canadian National Collection at Ottawa. Most of the remaining records are from the collection of the California Insect Survey, University of California, Berkeley. Dr. J. G. Rozen assisted in the transcription of data from specimens.

[2] Characters extracted from original description.

2. Dorsum of thorax clothed with black or dark brownish hairs.....3
— Dorsum of thorax clothed with bright reddish hairs; mesoscutum dull; metasomal terga with a narrow impunctate margin, pubescence long, dense, plumose. Length of anterior wing 10.0 mm.[3] Colorado and Wyoming. Monolectic on *Oenothera*.....*anograe* Cockerell
3. Wings heavily infuscated.....4
— Wings lightly tinted with black.....5
4. Wings very dark black; size larger, length of anterior wing 9.7–11.0 mm. California: Sierra Nevada montane. Monolectic on *Oenothera*.....*grundeli grundeli* Linsley[4]
— Wings dark brownish: size smaller, length of anterior wing 8.8–9.6 mm. Southern California montane. Monolectic on *Oenothera*.....*grundeli bernardina* Linsley
5. Propodeal enclosure coarsely rugose; most mesoscutal punctures less than one diameter apart.....6
— Propodeal enclosure rugulose: most mesocutal punctures at least one diameter apart.....10
6. Metasomal terga with a very broad impunctate apical margin, covering most of apical impression, at least medially.....7
— Metasomal terga with a narrow impunctate apical margin, covering less than one-half of apical impression.....8
7. Mesoscutum dull, interspaces between discal punctures reticulate; dorsal metasomal hairs long, predominantly plumose. Length of anterior wing 7.4–7.9 mm. Lowlands of coastal and interior southern California. Monolectic on *Oenothera* (?).....*blaisdelli* Cockerell
— Mesoscutum shining, interspaces between most discal punctures smooth, not reticulate; dorsal metasomal hairs short, predominantly simple. Length of anterior wing 7.0–7.5 mm. California: western margin of Mojave Desert. Monolectic on *Oenothera* (?).....*flandersi* Timberlake
8. Tibial scopa loose, suberect; notal hairs of thorax not dense and velvety, underlying punctures distinct.....9
— Tibial scopa dense, compact; notal hairs of thorax dense, velvety, black, underlying punctures very dense, subcontiguous. Length of anterior wing 7.2–8.0 mm. Lowlands of coastal and interior California. Monolectic on *Phacelia*.....*nigra* Provancher
9. Propodeal enclosure obliquely rugose; notal hairs of thorax brownish; discal hairs on second metasomal tergum short, predominantly simple; labrum with produced apex of process wider than long, depresso-emarginate. Length of anterior wing 8.1–8.9 mm. Colorado Desert, California. Monolectic on *Oenothera*.....*rozeni* Linsley and MacSwain
— Propodeal enclosure irregularly rugose; notal hairs of thorax black; most discal hairs on second metasomal tergum long, predominantly plumose; labrum with produced apex of process usually longer than wide, constricted at base. Length of anterior wing 8.4–9.1 mm. Lowlands and foothills of central and southern California and southeastern Arizona. Monolectic on *Oenothera*.....*oenotherae* Timberlake

[3] Wing lengths measured from apex of costal sclerite.

[4] A. (M.) **omninigra** Viereck, 1917, has not been positively recognized and may be identical with one of the subspecies of **grundeli.**

10. Tibial scopa loosely formed of long, erect hairs; discal hairs on second metasomal tergum short (less than 0.15 mm.) predominantly simple....11
— Tibial scopa densely formed of compact, more or less depressed hairs; discal hairs on second metasomal tergum moderately long (more than 0.20 mm.), predominantly plumose....12

11. Mesoscutum shining, punctures mostly two or more puncture widths apart; metasomal terga with a narrow impunctate apical margin comprising, at middle, less than one-third of apical impression. Length of anterior wing 9.0 mm. Colorado Desert, California. Monolectic on *Oenothera*....*rubrotincta* Linsley
— Mesoscutum feebly shining, punctures mostly one or two puncture widths apart; metasomal terga with a broad impunctate apical margin comprising, at middle, one-half of apical impression, Length of anterior wing 8.5–9.2 mm. Colorado Desert, California. Monolectic on *Oenothera*....*linsleyi* Timberlake

12. Labrum with process apically produced and emarginate; smaller species....13
— Labrum with process entirely, not produced; larger species. Length of anterior wing 9.25–10.25 mm. California: western Mojave Desert. Monolectic on *Oenothera*....*mojavensis* Linsley and MacSwain

13. Metasomal terga black, rarely with a faint bluish tint; propodeum finely granulate-punctate, enclosure finely, closely, longitudinally rugulose; impunctate apical margin of metasomal terga moderately broad. Length of anterior wing 7.9–8.9 mm. California: western Mojave Desert and southeastern San Joaquin Valley. Monolectic on *Oenothera*....*deserticola* Timberlake
— Metasomal terga with a distinct bluish tint; propodeum coarsely granugranulate-punctate, enclosure strongly and transversely or obliquely rugulose; impunctate apical margin of metasomal terga narrow. Length of anterior wing 8.2–8.9 mm. California: Sierra Nevada montane. Monlectic on *Oenothera*....*vanduzeei* Linsley

Males

1. Wings heavily infuscated....2
— Wings lightly tinted with black....3

2. Hairs of face, thorax and legs almost completely white. California: Sierra Nevada montane....*grundeli grundeli* Linsley
— Hairs of face, thorax and legs predominantly black. Southern California montane....*grundeli bernardina* Linsley

3. Dorsum of thorax clothed with white or predominantly whitish hairs....4
— Dorsum of thorax clothed with bright reddish hairs; mesocutum dull; metasomal terga with a narrow impunctate margin, pubescence long, dense, plumose. Colorado and Wyoming....*anograe* Cockerell

4. Metasomal terga with numerous long, erect, pale hairs; mesoscutum rather sparsely hairy on disk, surface not obscured by pubescence....5
— Metasomal terga without long erect, pale hairs except on first one; mesoscutum moderately densely to densely hairy (except *rozeni*)....6

5. Metasomal terga with a broad impunctate margin; hairs of face white; metasoma black. California: western margin of Mojave Desert..... *flandersi* Timberlake

— Metasomal terga with a narrow impunctate margin; hairs of face predominantly black, with a white moustache; metasoma with a distinct bluish tint. California: Sierra Nevada montane..... *vanduzeei* Linsley

6. Metasomal terga with a moderately broad to broad impunctate margin; process of labrum emarginate or bilobed..... 7

— Metasomal terga with a narrow impunctate margin; process of labrum nearly entire, not bilobed; facial hairs black. Lowlands of coastal and interior California..... *nigra* Provancher

7. Facial hairs white or predominantly white..... 8

— Facial hairs black. Lowlands and foothills of central and southern California and southeastern Arizona..... *oenotherae* Timberlake

8. Enclosure of propodeum rugulose; dorsal metasomal pubescence white..9

— Enclosure of propodeum coarsely rugose; dorsal metasomal hairs black except on first metasomal tergum; length of anterior wing 7–9 mm. Colorado Desert, California..... *rozeni* Linsley and MacSwain

9. Process of labrum nearly twice as broad as long; facial hairs white; dorsum of thorax feebly shining; length of anterior wing 7–8 mm. Colorado Desert, California..... *linsleyi* Timberlake

— Process of labrum about as long as broad; facial hairs predominantly white but with an intermixture of black; length of anterior wing 7 mm. Lowlands of coastal and interior southern California.... *blaisdelli* Cockerell

ANDRENA (MELANDRENA) ANOGRAE Cockerell

Andrena anograe Cockerell, 1901, Canad. Ent., 33:154, ♀.

Andrena micranthophila Cockerell, 1906, Bull. Amer. Mus. Nat. Hist., 22:432, ♀ ♂, *New synonymy.*

New records from the Timberlake collection are as follows: Salida, Colorado (1 ♀, June 20, bearing a few pollen grains of *Oenothera*, Chas. Wagner); Princeton Hot Springs, Colorado (1 ♂, June 16, 1933, Chas. Wagner); and Cheyenne, Wyoming (1 ♂, June 11, 1920).

Mr. Timberlake, who has the type of *micranthophila* regards it as the same as *anograe*. We are likewise unable to distinguish the two on the basis of the published descriptions and available specimens.

ANDRENA (MELANDRENA) GRUNDELI GRUNDELI Linsley, new status

New California records for *A. (M.) grundeli grundeli* include: Snowline Camp, El Dorado Co. (1 ♀, June 20, 1948, P. D. Hurd) (1 ♀, June 27, 1948, J. W. MacSwain); Folsom, Sacramento Co. (1 ♀, May 18, 1952, T. Haig); Yosemite Valley, Mariposa Co. (1 ♀, March 2, 1938, J. R. Warren); and Oakhurst, Madera Co. (1 ♀, June 8, 1942, E. G. Linsley).

ANDRENA (MELANDRENA) GRUNDELI BERNARDINA Linsley, new status

California records for this subspecies are: Tanbark Flat, Los Angeles Co. (3 ♀ ♀, June 20, 1950, at *Cyptantha* but not collecting pollen, J. W.

MacSwain) (1♀, June 23, 1952, Joan Linsley); San Antonio Canyon, Los Angeles Co. (1♀, May 20, 1929, D. Clancy); and Seeley Flats, San Bernardino Mts. (2♀♀, July 3-5, 1917, R. May).

ANDRENA (MELANDRENA) BLAISDELLI Cockerell

Material, all from California, which has not been reported previously is as follows: Riverside (8♀♀, March 4 to May 16, at flowers of *Cryptantha intermedia*, but not collecting pollen; 29♂♂, February 27 to April 26, at *Cryptantha intermedia* (P. H. Timberlake); Galivan, Riverside County (3♂♂, April 4, 1952, *Cryptantha intermedia;* 1♀, March 6, 1935, at *Oenothera dentata* but not collecting pollen, C. M. Dammers) (1♂, February 22, 1937, at *Salix lasiolepis*, E. G. Linsley); Altadena, Los Angeles County (1♀, May 2, 1936, C. D. Michener); La Crescenta, Los Angeles County (1♂, April 19, 1936, *Cryptantha intermedia*, E. G. Linsley); Cajon Pass, Los Angeles County (1♀, April 25, 1936, D. Clancy); Tujunga, Los Angeles County (1♂, April 16, 1937, *Oenothera bistorta*, P. H. Timberlake); and Mojave Desert near Deep Creek, San Bernardino County (1♀, April 30, 1939, *Cryptantha intermedia*, but not collecting pollen, P. H. Timberlake).

The males previously regarded as *blaisdelli* by Timberlake (1937) and Linsley (1938) are here treated as *oenotherae*. They are currently so assigned in the Timberlake collection and we have found these males at Antioch, Contra Costa County, California with female *oenotherae* far north of the known range of *blaisdelli*

ANDRENA (MELANDRENA) FLANDERI Timberlake

New records, all from California, include: Short Canyon, 6.5 miles N.W. of Inyokern, Kern County (2♂♂, 1♀, April 12, 1954, at *Cryptantha* but not collecting pollen, J. W. MacSwain); Kramer Junction, San Bernardino County (2♀♀, April 27, 1946, E. G. Linsley, J. W. MacSwain and R. F. Smith) (1♀, April 30, 1953, at *Chaenactis* but not collecting pollen, P. D. Hurd); Pallatt Creek, Los Angeles County (1♀, April 22, 1950, C. D. MacNeill); and Morongo, San Bernardino County (1♀, April 22, T. D. A. Cockerell).

When females of this species and *A. blaisdelli* were examined all but one carried at least a few pollen grains of *Oenothera*, none were found with pollen loads from other plants. This evidence is interpreted as indicating that both species collect pollen from *Oenothera*.

ANDRENA (MELANDRENA) NIGRA Provancher

Previously unrecorded collections, all from California, include the following: Temecula, Riverside County (5♀♀, April 24, 1951, E. I. Schlinger, and R. C. Bechtel); Westwood Hills, Los Angeles County (1♀, February 29, 1936, E. G. Linsley); Palmdale, Los Angeles County (1♀, April 11, 1936); 6 miles East of Pearblossom, Los Angeles County (1♀, May 2, 1952, G. A. Marsh); Claremont, Los Angeles County (1♂, E. O. Essig); Carpenteria, Santa Barbara County (2♀♀, April 15, 1938, *Phacelia distans*, B. E. White); Panoche Hills, San Benito County (1♀, April 29, 1922); Little

Panoche Canyon (1 ♀, May 15, 1930, E. G. Linsley); and 6 miles West of Tracy, San Joaquin County (1 ♀, March 6, 1950, J. W. MacSwain).

A. nigra is aberrant in that it is the only species of the North American *Melandrena* which is definitely not associated with *Oenothera*.

Andrena (Melandrena) rozeni Linsley & MacSwain, new species

Female.—Integument black metasoma faintly tinted with reddish; hairs black, those of notum of thorax with a brownish cast. *Head* with clypeus convex, shining, finely and closely punctured with a faint indication of median smooth line; labrum with process broader than long, base a low triangle, apex distinctly produced, broader than long, feebly depresso-emarginate in type, more distinctly in some paratypes; vertex with an impunctate area along upper margin of facial foveae between ocelli and compound eyes; antennae with first flagellar segment about as long as second and third combined, flagellum dark reddish-brown beneath. *Mesosoma* with mesoscutum dullish, finely and closely punctured, punctures on posterior middle of disk one to one and one-half puncture widths apart with interspaces minutely reticulate; mesoscutellum punctured much as mesoscutum; mesopleura a little more densely punctured than mesoscutum; propodeum with basal enclosure well defined, very coarsely and somewhat obliquely rugose, remaining surface coarsely, densely rugoso-punctate; wings subhyaline, tinted with blackish; legs with scopa of posterior tibiae long and dense. *Metasoma* slender, apical margin of terga scarcely constricted, surface shining, finely but not closely punctured, first metasomal tergum with a narrow impunctate margin, broad on terga two to four; pubescence of second tergum moderately thin, short, simple. Length approximately 11.5 mm., anterior wing 8.5 mm.

Male.—Integument black; hairs of head, thorax, propodeum, anterior femora (intermediate and posterior femora predominantly), and first metasomal tergum, long, erect, white, elsewhere dark brown or black. *Head* with clypeus shining, moderately densely punctate at middle, more densely at sides; labrum with process emarginate, somewhat acutely bilobed; antennae with flagellum brownish, first flagellar segment nearly as long as second. *Mesosoma* with dorsal pubescence thin, not obscuring punctation; mesoscutum dull, moderately closely punctate on disk, densely at sides; propodeum densely punctate, enclosure coarsely, longitudinally rugose. *Metasoma* with a narrow impunctate margin on first metasomal tergum, broad on terga two to five. Length approximately 10 mm., anterior wing 8.5 mm.

Holotype female and allotype male (California Academy of Sciences, Entomology) from NEAR NEEDLES, SAN BERNARDINO COUNTY, CALIFORNIA, March 6, 1930 (E. G. Linsley) and paratypes, all from California, as follows: four females and one male with same data as holotype, two females from Needles, December 3 and 4, 1921, two males from Needles, March 5, 1947 (E. G. Linsley and R. F. Smith), one male 30 miles S. of Needles, March 6, 1946 (E. G. Linsley), one male from Coachella Valley, River-

side County, March 4, 1936 (M. L. Cook), one male and one female 4 miles E. of Desert Center, Riverside County, April 5, 1951 (P. D. Hurd), one female from Hopkins Well, Riverside County, April 28, 1949, on *Oenothera trichocalyx* (J. E. Gillaspy), two females from the same locality, April 29, 1952 (J. G. Rozen), 67 males and 31 females, a few with heavy loads of *Oenothera* pollen, from Thousand Palms, Riverside County, on various dates from February 25 to March 16, 1955 (D. F. Hardwick, J. E. H. Martin, W. R. Mason and W. R. Richards), five males and two females from Palm Canyon, Riverside County, February 23, 1955 (W. R. Mason), one female from Palm Desert, Riverside County, February 28, 1955 (W. R. Mason), nine males and one female from Salton Sea, Riverside County, March 2, 1955 (W. R. Richards), one female from La Quinta, Riverside County, March 5, 1955 (D. F. Hardwick), one female from Bell Picnic Area, Joshua Tree National Monument, April 9, 1952 (J. W. MacSwain), one male from Indio, Riverside County, April 5, 1951 (J. W. MacSwain), and a copulating pair, same data (P. D. Hurd), and one male from 7 miles N. of Vidal Junction, San Bernardino County, April 3, 1951 (E. G. Linsley).

A stylopized male and female from Needles, California, March 10, 1923 and December 17, 1921 respectively (R. M. Bohart collection) are not included in the paratype series. Additional stylopized males and females were among the series collected by Hardwick, Martin, Mason and Richards. Some of the females in the type series bear *Oenothera* pollen.

A. (M.) rozeni is closely related to *A. (M.) oenotherae* Timberlake. The female differs from *oenotherae* in having the produced apex of the process of the labrum wider than long, the notal hairs of the thorax brown rather than black, the upper margin of the facial foveae impunctate, the enclosure of the propodeum more coarsely and obliquely rugose, and the metasoma more slender, with the apical margins of the terga feebly impressed and constricted, the surface less densely punctate and pubescent, with the impunctate margins of the metasomal terga broad except on the first one. The male differs at once from *oenotherae* in the white pubescence of the face and thoracic pleura.

Among the females there is some variation in the width of impunctate margin of the metasomal terga, the development of the

apex of the process of the labrum, and the extent of the brownish pubescence on the thorax.

ANDRENA (MELANDRENA) OENOTHERAE Timberlake

New California records: Newport Bay, Orange County (1♀, June 26, 1941, P. D. Hurd); Balboa Island, Orange County (1♀, June 17, 1917, R. May); El Segundo Dunes, Los Angeles County (2♀♀, May 17, 30, 1941, K. D. Snyder); Short Canyon, 6.5 miles N. W. of Inyokern, Kern County (20♀♀, various dates in April (1954, 1955 on *Oenothera dentata* var. *johnstonii* Munz, E. G. Linsley, J. M. Linsley, J. W. MacSwain, R. F. Smith); 20 mi. E. Bakersfield, Kern County (3♀♀, March 28, 1953, J. W. MacSwain); Blackwells Corner, Kern County (1♀, April 7, 1950, at *Lupinus* but not collecting pollen, P. D. Hurd); near Hemet, Riverside County (1♀, June 7, 1942 at *Hemizonia kelloggii* but not collecting pollen. P. H. Timberlake); Palm Springs, Riverside County (1♂, March 24, 1933, P. H. Timberlake) (1♀, March 20, 1948, W. McNeil); Carlsbad, San Diego County (1♂, March 21, 1933, *Layia platyglossa*, H. L. McKenzie); Newport, Orange County (1♂, August 6, 1933, C. M. Dammers); Riverside (49♂♂, various dates in various years from February 10 to April 4, mostly at flowers of *Cryptantha intermedia*, 1 or 2 each from *Sisymbrium*, *Encelia*, *Lantana* and *Calandrinia*, P. H. Timberlake); Dillon Beach, Marin County (2♀♀, February 12, 1939, nesting in sand, J. W. MacSwain); Antioch, Contra Costa County (1♂, April 25, 1936, M. Cazier); Wineville, Riverside County (1♂, April 15, 1938, at *Oenothera*, C. M. Dammers); Glendale, Los Angeles County (6♀♀, June 25, 1941, and July 12, 20, 1950, E. I. Schlinger); Hemet, Riverside County (2♀♀, April 16, 1954, N. A. Browne); and Saticoy, Ventura County (2♀♀, May 30, 1926, L. M. Smith)

A. oenotherae is the most widely distributed and morphologically variable species of those which we have studied. It may be that it represents a complex of more than one species but if so we have been unable to distinguish them.

ANDRENA (MELANDRENA) RUBROTINCTA Linsley

New California records: Borego, San Diego County (1♀, March 26, 1941, Mrs. R. C. Dickson); 4 miles E. of Desert Center, Riverside County (1♀, April 5, 1951, P. D. Hurd); and LaQuinta, Riverside County (1♀, March 5, 1955, D. F. Hardwick).

ANDRENA (MELANDRENA) LINSLEYI Timberlake

Additional California records: near Needles, San Bernardino County (1♂, March 6, 1930, E. G. Linsley); Hopkins Well, Riverside County (2♀♀, April 27-28, 1949, *Oenothera*, J. E. Gillaspy and L .W. Quate) (6♀♀, April 29, 1952, at *Baileya* but not collecting pollen, P. D. Hurd, G. A. Marsh, and J. G. Rozen); Palm Springs, Riverside County (1♀, April 4, 1948, J. W. MacSwain); 18 miles W. of Blythe, Riverside County (1♀, April, 1952, at *Geraea canescens* but not collecting pollen, P. H. Timberlake); Thousand Palms, Riverside County (40♂♂, 22♀♀, including one mating pair, February 25–March 12, 1955, D. F. Hardwick, J. E. H. Martin, W. R. Mason, W. R. Richards; Palm Canyon, Riverside County (19♂♂,

6♀ ♀, February 23, 1955, W. R. Mason); Indio, Riverside County (3♂ ♂, March 4, 1955, 1♀ March 12, 1955, W. R. Mason); Salton Sea, Riverside County (23♂ ♂, 1♀, March 2, 1955, W. R. Richards); and La Quinta, Riverside County (13♂ ♂, February 28–March 5, 1955, D. F. Hardwick and J. E. H. Martin).

The capture of a mating pair on *Encelia* between 10 and 11 a.m. on February 26, 1955, by W. R. Mason, has permitted the recognition of the male of this species. Some individuals are stylopized.

Andrena (Melandrena) mojavensis Linsley & MacSwain, n sp.

Female.—Integument black, metasoma faintly tinted with reddish in a few paratypes; hairs black. *Head* with clypeus convex, shining, coarsely and sub-contiguously punctured with a narrow, elevated, impunctate median line; labrum with process subtriangular, apex not produced, moderately elevated, elevation an inverted triangle; antennae with first flagellar segment about as long as second and third combined. *Mesosoma* with mesoscutum shining, finely and moderately densely punctured, punctures mostly one or two puncture widths apart, interspaces finely reticulate anteriorly and laterally, smooth postmedially; mesoscutellum with larger and slightly less dense punctures than mesoscutum; mesopleura a little more densely punctured than mesoscutum; propodeum finely granulate, punctate, basal enclosure well defined, surface very finely, irregularly rugulose; wings subhyaline, tinted with blackish; legs with scopa of posterior tibiae long and dense. *Metasoma* shining, clothed with numerous moderately long erect black hairs, hairs on posterior portion of second tergum simple, on anterior portion distinctly plumose, first four metasomal terga with an impunctate apical margin, which at middle occupies almost one-half of posterior depression, pubescence longer and denser toward lateral margin giving sinuous appearance to metasomal margins in dorsal aspect. Length approximately 14mm., anterior wing 10 mm.

Holotype female (California Academy of Sciences, Entomology) from SHORT CANYON, 6.5 MILES N.W. OF INYOKERN, KERN COUNTY, CALIFORNIA (April 13, 1954, *Oenothera dentata* var. *johnstonii* Munz (James M. Linsley); and 124 female paratypes, same locality (April 11 to 19, 1954 and March 15 and April 3 to 18, 1955, *Oenothera dentata* var. *johnstonii* and *O. clavaeformis* Torrey and Fremont, E. G. Linsley, J. M. Linsley, J. W. MacSwain, C. D. MacNeill and R. F. Smith).

A. (M.) mojavensis is the largest and most robust of the relatively clear-winged *Melandrena*. It is related to *A. (M.) rubrotincta* Linsley but it differs in the long pubescence of the metasoma, most of which is plumose, the smooth inter-puncture areas of the posterior discal region of the mesoscutum, the distinct, elevated, impunctate median line of the clypeus, and the totally black pube-

scence (in *rubrotincta* the pubescence is wholly or largely brownish-black).

ANDRENA (MELANDRENA) DESERTICOLA Timberlake

The following are new California records: Short Canyon, 6.5 mi. N. W. of Inyokern, Kern County (57♀♀, various dates in April, 1954, 1955, *Oenothera dentata* var. *johnstonii* Munz, E. G. Linsley, J. M. Linsley, J. W. MacSwain, R. F. Smith); Kramer Junction, Riverside County (2♀♀, April 27, 1950, S. F. Bailey); and 20 mi. E. Bakersfield, Kern County (1♀, March 23, 1953, J. W. MacSwain).

ANDRENA (MELANDRENA) VANDUZEEI Linsley

New California records include: Buck, Plumas County (1♀, July 23, 1937, F. X. Williams); and Mill Creek Camp, Tuolumne County (2♀♀, July 13, 1951, R. C. Bechtel).

LITERATURE CITED

LANHAM, U. N.

1949. A subgeneric classification of the New World bees of the genus *Andrena*. Univ. Calif. Publ. Entom., 8(5):183-238.

LINSLEY, E. G.

1938. Studies in the Andrenidae of North America—I. Proc. Calif. Acad. Sciences, (4)23:263-282.

LINSLEY, E. G., J. W. MACSWAIN AND R. F. SMITH

1955. Observations on the nesting habits and flower relationships of some species of *Melandrena*. Pan-Pacific Ent., 31(4):173-185.

TIMBERLAKE, P. H.

1937. New species of *Andrena* from California. Pan-Pacific Ent.,13:69-74.

BOOK NOTICE

INSECTS OF MICRONESIA. Volume 1: Introduction by J. Linsley Gressitt. Bernice P. Bishop Museum, Honolulu, December, 1954. i-viii, 257 pp. 70 figs.

This is the first of a series of volumes covering all of the inscets and most of the other terrestrial arthropods inhabiting Micronesia—the Bonin, Volcano, Mariana, Carolina, Marshall and Gilbert Islands. Twenty volumes are planned in the ambitious project which is being carried out by well over 100 specialists. Dr. Gressitt is editor of the series as well as one of its authors. In volume 1 he describes the geology, soils, climate, flora, fauna, overall ecology, and economic entomology of Micronesia in general and of each island or island group. Many of his illustrations are maps but there are 95 photographs of terrain. He discusses collecting, collectors and collectors' localities—the last enumerated in a 16 page gazetteer. In this excellent piece of work the author sets a high standard for the rest of the series. As stated in the foreword, "His introduction is more than a technical preface; it presents a comprehensive survey of the natural history of Micronesia that will be of interest to a wide audience."—R. M. BOHART, *Department of Entomology and Parasitology, University of California, Davis.*

OBSERVATIONS ON THE NESTING HABITS AND FLOWER RELATIONSHIPS OF SOME SPECIES OF MELANDRENA

(Hymenoptera: Andrenidae)

E. G. LINSLEY, J. W. MACSWAIN, AND RAY F. SMITH[1]

University of California, Berkeley

Although the nesting habits of a number of European species of *Andrena* have been reported (Perkins, 1919; Malyshev, 1926; Bischoff, 1927; Ulrich, 1933; Nielsen, 1934; *et al*), fragmentary information is available for less than a dozen of the more than five hundred described North American species (Linsley, 1951). The available information is due largely to Packard (1868), Smith (1901), Rau (1922, 1935), Parker and Böving (1924), Hicks (1926, 1934), MacSwain (1945), Bohart (1952), and Sivik (1954). Pollen flowers have been reported for about ten per cent of the known North American species (Linsley, 1951) although details of pollen collecting behavior and diurnal activity cycles are essentially lacking for all. Except for *A. nigra*, species of the subgenus *Melandrena* are not commonly encountered in the field, apparently because they are most abundant very early in the season and collect pollen very early in the morning. Nothing has been recorded of the nesting habits of any North American species. For a key to the North American species see preceding paper by Linsley and MacSwain (1955).

When, in 1954, large populations of *Melandrena* were discovered in Short Canyon on the western edge of the Mojave Desert, an attempt was made to learn something of the habits of the group. Considerable biological data was gathered between April 11 and 18. Unfortunately much of this information was not very useful since it was later found that three superficially similar species of *Melandrena* (*A. mojavensis* Linsley and MacSwain, *A. oenotherae* Timberlake, and *A. deserticola* Timberlake) were involved and all were collecting pollen almost exclusively from one species of *Oenothera*. In 1955, the area was revisited, but inclement weather limited observations and interfered with bee activity. Since the opportunity for further studies in this area appears to be remote, our fragmentary biological observations are offered now. These

[1] The authors wish to acknowledge the assistance furnished by their wives Juanita Linsley, Jane MacSwain, and Elizabeth Smith, and by James M. Linsley, during the two brief vacation periods which were partially occupied by this study.

are presented in the form of generalizations concerning the subgenus, brief comparative accounts of the species, followed by a discussion of some of the factors which may permit the coexistence of these three closely related species under conditions of what appears to be intense competition.

THE SHORT CANYON HABITAT

Short Canyon is located at the base of the east side of the Sierra Nevada mountains six miles west of Inyokern, Kern County, California. The canyon rises abruptly from its mouth to the upper section which is bounded on the north and south by sand covered hills and on the west by steep rocky slopes. The north slope has produced a broad alluvial fan which stretches down to the main wash in the center of the canyon. Three species of *Oenothera* bloom in the canyon in March and April (possibly also May and later). The large, white-flowered *Oenothera pallida* Lindl., grows in the fine sand of the wash but appears to be completely ignored by the species of *Melandrena*. *Oenothera clavaeformis* Torrey and Fremont, a small-flowered, whitish species grows on the steeper slopes at the base of rocky outcroppings and cliffs. *A. mojavensis* was found visiting this species under certain conditions. A small yellow-flowered species, *Oenothera dentata* var. *johnstonii* Munz, the main pollen source, was common on the floor and sandy slopes of the canyon. A large but scattered population of this plant occurs on the alluvial fan and a smaller but denser stand on a steep sandy area among the rocks on the sides of the canyon. These two areas are about one-quarter of a mile apart and are separated by the almost barren upper portion of the wash.

The weather in Short Canyon, like most of the Mojave Desert, is extremely variable in February, March and April and light to heavy winds blow from the mountains across the desert almost every day. The nearest weather station is at Inyokern, out on the desert approximately six miles east of the Canyon. Weather records have been kept since 1952 and, although not an accurate reflection of conditions in the canyon, they do give an indication of trends in the area. During this brief period, the months of February and April (March means were similar in the four years) were warmest in 1954, coolest in 1955. Thus in 1954 the mean of the daily maximums for these two months respectively were 21.5°C and 28°C, the minimums 4.0°C and 10.2°C. In 1955, the comparable figures were 15.7°C and 23.8°C, and −2.4°C and 3.8°C. In

the period February through April, 1954, there were only 12 days in which the minimum temperature fell to or below 0°C (none in April). During these months in 1955 there were 41 days at or below 0°C (7 of these in April). During the 1954 observation period (April 11-18) the average daily maximum was 31.0°C, the minimum 9.2°C. During the same period in 1955, the corresponding figures were 24.3°C and 6.0°C. These variations in temperatures appear to have had a pronounced effect upon bee activity.

Rainfall indirectly affected conditions for bees in Short Canyon through its influence on the abundance of flowers. Cattlemen operating in Short Canyon reported the 1955 spring the coldest in their experience in the area and forage for cattle the poorest. Total rainfall for the months of February, March, and April, 1955 was .07 inches. In the corresponding period in 1954, the total was 1.54 inches (Inyokern readings). These differences were apparently reflected in the pronounced differences in the abundance of *Oenothera* in Short Canyon in the two seasons.

Wind records from Inyokern are not correlated directly with conditions in Short Canyon. In general there was a down-canyon draft in the morning an up-canyon draft in the afternoon. When these were strong and gusty during periods of bee activity, they clearly reduced and hampered the flight of the bees.

DISTRIBUTION AND FLOWER RELATIONSHIPS

The North American species now assigned to the subgenus *Melandrena* (Lanham, 1949) are limited to the area from the Rocky Mountains (Wyoming, Colorado and New Mexico) to the Pacific Coast (Oregon and California). Of the species listed by Linsley (1951), ten are restricted to California.

In so far as now known, all of the species exhibit a high degree of oligolecty (or monolecty) being restricted in pollen collecting to a single genus of plants. Thus *A. nigra* Provancher appears to take pollen only from *Phacelia* (Linsley, 1938) and *A. oenotherae* Timberlake only from *Oenothera* (Timberlake, 1937) The Coloradan *A. anograe* Cockerell (1901) was also captured on *Oenothera* which is presumably its pollen source (a specimen from Salida, Colorado has *Oenothera* pollen on the legs). However, numerous species of plants are visited by various species of *Melandrena* for nectar alone, and this fact accounts for the large number of museum flower records reported by Timberlake (1937)

and Linsley (1938). An examination of available specimens of *A. grundeli grundeli* Linsley, *A. g. bernardina* Linsley, *A. vanduzeei* Linsley, *A. rubrotincta* Linsley, *A. flandersi* Timberlake, *A. blaisdelli* Cockerell, *A. rozeni* Linsley and MacSwain, and *A. linsleyi* Timberlake, revealed that the only kind of pollen being carried was that of *Oenothera*. This last species was also found collecting pollen from *Oenothera trichocalyx* Nutt. by P. D. Hurd and others at Hopkins Well, Riverside County, California, and *A. deserticola* Timberlake and *A. mojavensis* Linsley and MacSwain were shown to be *Oenothera* monoleges in the course of the present study. Thus, excluding *A. omninigra* Viereck which has not been recognized definitely in our material, all of the species and subspecies known to occur in California except *nigra* (Hydrophyllaceae: *Phacelia*), appear to be restricted in pollen source to *Oenothera* (Onagraceae). Further, near Needles, San Bernardino County, and at La Quinta, Riverside County, three species *(rubrotincta, linsleyi,* and *rozeni)* were captured together, as were *linsleyi* and *rozeni* at Hopkins Well, Thousand Palms, Palm Canyon and Salton Sea, Riverside County, and *rozeni* and *rubrotincta* 4 miles west of Desert Center, Riverside County. Since three species were also found in competition for the same pollen source in Short Canyon *(mojavensis, deserticola,* and *oenotherae)* and a fourth *(flandersi)* was found in small numbers, a number of evolutionary and ecological implications are involved.

Most of the species of *Oenothera* occuring in California grow in sandy areas, principally in desert regions. Such sites also appear to meet the nesting requirements of the associated species of *Melandrena,* at least to the extent indicated by the present study.

During mid-April, 1954, the time of day utilized for pollen collecting by *A. mojavensis, deserticola,* and *oenotherae* was largely limited to a period from about 40 minutes before sunrise to 30 or 35 minutes after the first direct sunlight reached the flowers. All three species were active during this period, and although specific differences in behavior are indicated these were not determined quantitatively. On April 14, 1954 (minimum temperature of previous night 5°C) the first bees were gathering pollen at 5:15 A.M., the sun reached the flowers at 5:54 A.M., and no bees were seen on the flowers after 6:30 A.M. On April 15, 1954 (minimum temperature of previous night 10°C), pollen collecting was first observed at 5:07 A.M., direct sunlight was on the flowers at 5:50

A.M., and no bees were seen after 6:23 A.M. By contrast, during cold spells (April 10, 17, and 18, 1955), the earliest and latest pollen collectors were, respectively 6:03–7:03 A.M., 5:41–6:22 A.M., and 7:10–7:29 A.M., indicating the modifying effect of cold temperatures (10-15°C lower at time of flight). In both years occasional individuals were seen visiting flowers (but not collecting pollen) in the later part of the afternoon and on overcast days, at other times.

When the bees emerged from their burrows for the first pollen trips of the morning, they had a tendency to visit flowers close to the nest. In two cases, the first load of pollen was gathered within two feet of the entrance. For the first trips, six or seven flowers were sufficient to provide a pollen load, although these loads frequently appear to be lighter than those gathered later. On April 14, 1954, the first five bees timed visited an average of 7.2 flowers per pollen load in an average period of 103 seconds. The next four bees collected from an average of 17.5 flowers per load over an average of 190 seconds but had to reject an average of 10 additional flowers from which the pollen had already been stripped. After the sun reached the flowers, the next four bees required only 178 seconds to complete a pollen load with an average of 16.3 yielding pollen and 16.5 lacking it. The same general behavior was evident on April 15, 1954.

While removing pollen from the flowers of *O. dentata*, the bees work slowly and ponderously. The pollen is carried loosely not only on the hairs of the tibiae, femora and trochanters but on much of the underside of the body. Many of the individuals are large and heavy in relation to the blossom, which usually bends downward from the bee's weight with the bee hanging underneath. Not infrequently bees will fall off of the flower to the ground and in cold weather they may remain for some time where they fall (they may be readily picked up by hand). Even under favorable conditions the bent over flower tends to obscure the bee and to make it difficult to estimate the number of individuals active at a given moment.

Unlike most other *Andrena*, the species of *Melandrena* are noisy fliers, suggesting the buzzing of certain anthophorids. This is evident when the bee is arriving at the flower site or leaving it but is not so obvious when it is moving from flower to flower. Sometimes, after a pollen load is completed, bees will fly to a low

shrub and "rest" before returning to their burrows. On other occasions, they fly directly to the burrow from the last flower visited.

ACTIVITIES AROUND BURROWS

In 1954 the activities of a number of bees around their burrows was observed on two consecutive days. On the third day eight of these were captured and were later identified as follows: one *A. mojavensis*, two *oenotherae* and five *deserticola*. Since most of their activity varied as much between individuals as between species a generalized account is reported here.

Most of the bees observed gathered pollen on both of the observation days and were captured when returning with additional pollen on the third day. Others, however, left their burrows on only two of these days and their burrows remained plugged with moist sand, either at or near the surface, during the other day. On pollen collecting days the burrows were usually opened long before the first flight, rarely only a few minutes before flight. After opening, the female remains just within the entrance until ready to leave. Flight away from the burrow is variable and some individuals fly a reconnoitering pattern over and around the burrow before the first and sometimes subsequent flights; others fly directly away. The first trip to the flowers and return is frequently as short as one minute, but in such cases the bee returns with a partial pollen load. The next several trips are completed in two to four minutes each and later trips in three to eight minutes. However this is the average condition and almost every individual varied on one or both days from this pattern.

When returning with a pollen load the females usually fly directly to the burrow and enter. More rarely they alight on bushes or the ground in the general nesting area and remain for several minutes before entering the burrow. The time individuals remained within the burrows varied from one to four minutes; but the time intervals for a given individual seldom varied by more than a minute.

The number of trips completed on a single morning correlates with the time of the first trip in relation to the starting time of other individuals. The bees which fly early usually makes six trips, those which start ten to fifteen minutes later seven or eight trips. In the latter cases the bees usually returned from their last trip in

a few minutes without completed pollen loads, or sometimes considerably later without any pollen.

The burrow is plugged with a core of sand five to fifteen minutes after the last trip of the morning. The plug is brought up from below and movements of the plugs indicate that three loads of moist sand are used. On warm days the burrows are unplugged at various times during the afternoon and usually plugged again before sundown.

Conspicious variations in these habits were observed in 1955 due to colder conditions. Under these circumstances many burrows remained closed all day and pollen collecting was sporadic.

Males were entirely absent from the nesting sites and flowers throughout the periods of observation in both 1954 and 1955. This suggests that mating takes place very early in the season before nesting activity has begun. A mating pair of the related *A. (M.) linsleyi* has been taken on February 26 and of *A. (M.) rozeni* on April 5 the male badly worn) (Linsley and MacSwain, 1955).

ANDRENA (MELANDRENA) MOJAVENSIS Linsley and MacSwain

This is the largest of the four species from *Oenothera* in Short Canyon. Female individuals range from 9.3 to 10.3 mm. in wing length[2] with a mode of 9.7 mm.

A large population of *A. mojavensis* nested in the steep sandy area among the rocks on the southern side of the canyon. A sample collection from this site on April 13, 1954, consisted of 70 *mojavensis* and 4 *oenotherae*; another on April 17, 1955, of 24 *mojavensis* alone. The species was also taken in numbers on the east facing slope of a hill at the northern edge of the canyon's mouth. A few individuals were found nesting on the alluvial fan at the northern side of the canyon in 1954 but only one in 1955.

Most observations of the flower habits of this species were made at the flowers of *Oenothera dentata* and it was only on the hills near the mouth of the canyon that it was found at *Oenothera clavaeformis* in the absence of the smaller plant species.

Burrows of *mojavensis* have a vertical entrance and, in the relatively coarse sand of the western slope, penetrate to an underlying layer of decomposing granite. Here the depth varied from 60 to 75 cm., and the diameter average almost 8 mm. A burrow in the finer sand of the alluvial fan had a similar diameter and a total depth of 60 cm.

[2] Measured from apex of costal sclerite to apex of forewing.

In 1955 the population of *mojavensis* on the upper slope was active on the flowers on April 17 and 18 although a cold wind was blowing down from the mountains and there was almost no activity among the bees nesting on the alluvial fan. However, this area is somewhat protected from the wind and receives sunlight earlier in the morning. Furthermore the slope receives the sun's rays more directly. On the warm morning of April 13, 1954 the first *mojavensis* were visiting the flowers on this slope at 5:10 A.M. and were numerous by 5:15 A.M. By contrast the first bees appeared on the alluvial fan at 5:20 A.M. and they were not abundant until 5:30 A.M. In this latter case it is suggested that the time difference is a reflection of the different species makeup in the two areas and the ability of *mojavensis* to fly slightly earlier than the other species.

In 1954 one female of *mojavensis* was nesting within a meter radius of a burrow of each of the other two species. On April 13 this female left her burrow at 5:21 A.M. and returned with a pollen load at 5:25 A.M. The female of *deserticola* left at 5:26 A.M. and returned with a load at 5:32 A.M. and the female of *oenotherae* left at 5:33 A.M. and returned with a load at 5:37 A.M. On this day the three females completed five pollen loads at 5:53 A.M., 6:06 A.M. and 6:03 A.M. respectively. Only the female of *mojavensis* made an additional trip from which she returned at 6:24 A.M. without pollen. On April 14 the female of *deserticola* did not leave her burrow but *mojavenis* made seven trips, the last a long one without gathering pollen and completed at 6:15 A.M., and the female of *oenotherae* eight trips. The female of *mojavensis* was not seen leaving on her first trip but returned with a full load at 5:16 A.M. (suggesting that she had left at about 5:10 A.M.) ; the other female *(oenotherae)* left at 5:28 A.M. returned at 5:29 A.M. with a poor load. Her second trip with her first full pollen load was completed at 5:35 A.M. and her last at 6:28 A.M. The times of first flight for four other females of *deserticola* and one other *oenotherae* on the same days were similar and are reported in the discussion of those species.

A conopid fly parasite of *mojavensis* was found in 1954. A female bee containing a large larval conopid was accidentally uncovered while digging a burrow of *Diandrena* on the alluvial fan. No adult conopids were observed in this area and it seems likely that the individual must have been attacked at an earlier period.

Although a number of burrows of *mojavensis* were observed on the upper slope no parasitic bees of the genus *Nomada* were seen to visit them. The same situation obtained with the burrow on the alluvial fan.

ANDRENA (MELANDRENA) OENOTHERAE Timberlake

A. oenotherae was described from thirty-four females most of which were from various localities in southern California, although two specimens were included from the San Francisco Bay region of California and one from the Chiricahua Mountains, Arizona. It is now the commonest species of the subgenus in collections and has been taken in association with several species of *Oenothera*. Females from Short Canyon range from 8.4 to 9.1 mm. in wing length with a mode of 8.9 mm. They are smaller than *A. mojavensis* and slightly larger than *A. deserticola*.

A few individuals of this species were collected on the southern slope of Short Canyon in 1954 but not in 1955. Burrows were not located on the slope but probably occured nearby. However, a somewhat larger number of individuals occurred on the alluvial fan. In 1954, two were found nesting and at least three others taken on the flowers of *Oenothera dentata*. In 1955 a total of 12 individuals were collected or found nesting in this same area.

The burrows of this species were located toward the upper portion of the alluvial fan either on or immediately adjacent to an unpaved road, where the sand was small-grained and hard-packed. The burrows were commonly in groups of two or three with burrows only a few centimeters apart. Less frequently they were found within a few centimeters of burrows of *deserticola*.

The observed burrows of *A. oenotherae* had slanting entrances which are readily separable from the vertical entrances of the other two species. The diameters and, to a lesser degree the depths, of the burrows vary with the size of the female so that the dimensions approach those of the smallest burrows of *mojavensis* or the largest of *deserticola*.

Data indicate that the seasonal activity of *oenotherae* in Short Canyon is slightly later than either *mojavensis* or *deserticola*. The clearest evidence of this is in the relative activities of females of *oenotherae* and *deserticola* on various dates in April, 1955. In early April when a majority of female *deserticola* were digging burrows the majority of female *oenotherae* were searching, presumably for suitable nesting sites. On April 10, numerous females

of the former species were gathering pollen but only one of the latter species was taken from the flowers. With other species of *Andrena* we have found that the species which appear first in the season also appear earliest in the day throughout the season. As stated above, *oenotherae* females were found to start their morning activity a few minutes to as much as twenty minutes later than females of either *mojavensis* or *deserticola*. Similarly on cold days when only one or two females were taken visiting flowers on the alluvial fan they were all *deserticola*. Of interest, was the capture of a female *oenotherae* and a female *deserticola*, on the same day in April, 1954, each of which was parasitized by a single female *Stylops*. Larvae were emerging from the *Stylops* female in the *deserticola* female but not from the other.

In addition to these parasites two unidentified species of nomadine bees were commonly seen entering the burrows of both of these *Melandrena* species and eggs and larvae of the parasites were found in several of the cells. Two meloid first instar larvae were also found in the cells, one a *Meloe* sp., the other *Lytta stygica* (LeConte). However, neither these beetles nor a bombyliid fly, which was seen to oviposit in the burrows, were shown to be parasites of these bees.

ANDRENA (MELANDRENA) DESERTICOLA Timberlake

A. deserticola was previously known from two females collected from the western part of the Mojave Desert. The series of females from Short Canyon range from 7.9 to 8.9 mm. in wing length with a mode of 8.4 mm. This is the smallest of the three species from *Oenothera* in Short Canyon.

This species was collected only on the alluvial fan where it was the most numerous of the three. In 1954 five were found nesting and nine taken on the flowers. In 1955 a total of 51 individuals was collected at the flowers or found nesting on this slope. Some females of all three species were collected at their burrows, identified and then released. The numbers of these latter individuals are not included in the figures given above.

Burrows of this species were most abundant adjacent to the road at the upper end of the alluvial fan. Their vertical entrances permit their separation from those of *oenotherae* and their narrow diameters from those of *mojavensis*. Upon excavation they were found to be the shallowest of the three species and several cells were only 45 cm. from the surface.

The diurnal activity and parasites of this species have been discussed under *A. oenotherae* above.

ANDRENA (MELANDRENA) FLANDERSI Timberlake

On April 12, 1954, two males and a female of this species were taken at flowers of *Cryptantha* during the middle of the day on the hillside where *A. mojavensis* was nesting. The female bore pollen grains of *Oenothera*. However, no other specimens were found and its ecological relationships with the three main species in Short Canyon remain unknown.

DISCUSSION

The factors which permit the survival of three competing species of *Melandrena* in Short Canyon were not obvious to us during the brief periods available for observations. Although the facts must await future investigations, perhaps a few speculations based upon other situations of which we have better knowledge, will be useful.

The various localities in which two or three species of *Melandrena* are known to compete successfully are desert localities in the Mojave and Colorado Deserts (Needles, Hopkins Well, Desert Center, Thousand Palms, La Quinta, Palm Canyon and Salton Sea). At Riverside and near Perris (Riverside County) two species *(oenotherae* and *blaisdelli)* fly at the same time but it is not known whether or not they collect pollen from the same species of *Oenothera*. Records from coastal and montane areas do not yet reveal more than one *Oenothera* monolege in a given locality. If these are indications of the true situation, it suggests that the desert habitat may be conducive to survival under competitive conditions.

In Short Canyon, a very favorable season, such as occurred in 1954, with an abundant pollen source extending over a long period of time and favorable flight conditions, is exceptional. Under such conditions, data available indicate that the three species share the available resources by differential nest site selection and slight differences in diurnal and seasonal activity. Thus *mojavensis* tends to nest on the steeper hillsides, *oenotherae* and *deserticola* in the flat, and *oenotherae* begins collecting pollen a little later in the morning and continues later in the season than do the other two species. There did not appear to be any competition for nesting sites, but competition for the daily supply of pollen was intense.

In cold seasons flight activity is greatly reduced and the survival of the species is close to the critical level. Although the available pollen is usually reduced, the bees are not able to utilize it

fully. Activity patterns are modified and the species which has the competitive advantage in the favorable season may not have it in the cold season. In dry seasons, the pollen source is greatly reduced, and the competitive pressure favors the species which is able to collect a pollen load rapidly in the early morning. The characteristic climatic variations in the desert regions may thus favor one species in one season and others in other seasons and in combination with differential nest site selection permit the survival of the three species in a single small area.

In the brief periods of observation during 1954 and 1955, parasites and predators were not observed to be significant limiting factors. There were some slight indications of different parasite complexes associated with various bee species. These could, in the favorable periods, contribute to the heterogeneity of the ecological situation and thus the survival of all three forms. If 1955 had been a favorable year for bee activity, it would have been an ideal time to make observations on this aspect.

LITERATURE CITED

BISCHOFF, H.
1927. Biologie der Hymenopteren. Berlin. vii+598 pp.

BOHART, G. E.
1952. Pollination by native insects. Yearbook of Agriculture, 1952: 107-121, figs.

COCKERELL, T. D. A.
1901. *Andrena anograe* n. sp., in: Morice and Cockerell, The American bees of the genus Andrena described by F. Smith. Canadian Ent., 33:154.

HICKS, C. H.
1926. Nesting habits and parasites of certain bees of Boulder County, Colorado. Univ. of Colo. Studies, 15:217-252.
1934. Some reared insect parasites and their hosts. Univ. Colo. Studies, 21:265-271, 3 figs.

LANHAM, U. N.
1949. A subgeneric classification of the New World bees of the genus *Andrena*. Univ. Calif. Publ. Entom., 8(5):183-238.

LINSLEY, E. G.
1938. Studies in the Andrenidae of North America—I. Proc. Calif. Acad. Sci., (4)23:263-282.
1951. Andreninae, in: Muesebeck, Krombein, and Townes, Hymenoptera of America north of Mexico. U. S. Dept. Agr. Monog. no. 2: 1052-1086.

LINSLEY, E. G. and J. W. MACSWAIN
1955. The North American andrenine bees of the subgenus *Melandrena* with descriptions of new species. Pan-Pacific Ent., 31(4):173-185.

MACSWAIN, J. W.
1945. Nesting habits of *Andrena rhodotricha* Linsley. Pan-Pacific Ent., 21:34.

MALYSHEV, S.
1926. The nesting habits of *Andrena* F. Trav. Soc. Nat. Leningrad, 56:25-78.

NEILSEN, E. T.
1934. Sur les habitudes des Hyménoptères aculéates solitaires. IV. (Apidae). Entom. Meddelelser, 8:421-472.

PACKARD, A. S.
1868. The home of the bees. Amer. Nat., 1:364-378, 596-606.

PARKER, J. B. and A. G. BÖVING
1924. The blister beetle *Tricrania sanguinipennis*—biology, descriptions of different stages, and systematic relationships. Proc. U. S. Nat. Mus., 64(23):1-40, pls. 1-5.

PERKINS, R. C. L.
1919. The British species of *Andrena* and *Nomada*. Trans. Ent. Soc. London, 1919:218-317.

RAU, P.
1922. Ecological and behavior notes on Missouri insects. Trans. Acad. Sci. St. Louis, 24:1-71, pls. 5-8.
1935. Notes on the nesting habits of the red-bellied bee, *Andrena erythrogastra* Ash. Ent. News, 45:35-37.

SIVIK, F. P.
1954. Ecological notes on three species of solitary bees. Ent. News, 65:253-256.

SMITH, J. B.
1901. Notes on some digger bees—I. Jour. New York Ent. Soc., 9:29-40.

TIMBERLAKE, P. H.
1937. New species of *Andrena* from California. Pan-Pacific Ent., 13:69-74.

ULRICH, W.
1933. Fan und Züchtung von strepsipteren. Handb. der biologisch. Arbeitsmethoden, Abt. 9, Teil 7. Heft 2, 259-327.

BOOK NOTICES

MORPHOLOGY AND BIOLOGY OF STURMIA HARRISINAE COQUILLETT (DIPTERA), A PARASITE OF THE WESTERN GRAPE LEAF SKELETONIZER. By Owen J. Smith, Paul H. Dunn, and John H. Rosenberger. Univ. Calif. Publ. in Ent., Vol. 10, No. 5, pp. 321-358, 25 text figs. University of California Press, Berkeley and Los Angeles; June 6, 1955. Price 50 cents.

THE MEGACHILINE BEES OF CALIFORNIA (Hymenoptera: Megachilidae). By Paul D. Hurd, Jr., and Charles D. Michener. Bull. Calif. Insect Survey, Vol. 3, pp. 1-248, incl. 24 pls., 112 maps. University of California Press, Berkeley and Los Angeles; May 31, 1955. Price $3.50. This study is based on the examination of some 15.000 specimens. It

provides ". . . usable keys, pertinent descriptive comments, and detailed data on distribution and floral visits of certain megachiline bees found in the state of California. The genera *Anthocopa, Ashmeadiella, Chelostoma, Chelostomopsis, Diceratosmia, Heriades, Hoplitis, Proteriades* are treated in detail, but the genera *Coelioxys, Megachile,* and *Osmia* are considered only to the subgeneric level."—HUGH B. LEECH, *Department of Entomology, California Academy of Sciences, San Francisco.*

ZOOLOGICAL NOMENCLATURE: NOTICE OF PROPOSED USE OF THE PLENARY POWERS IN CERTAIN CASES FOR THE AVOIDANCE OF CONFUSION AND THE VALIDATION OF CURRENT NOMENCLATORIAL PRACTICE (A.(N.S.)22)

Notice is hereby given that the possible use by the International Commission on Zoological Nomenclature of its Plenary Powers is involved in applications relating to the under-mentioned names included in Parts 3 and 4 of Volume 11 of the *Bulletin of Zoological Nomenclature,* both of which Parts were published on 28th February, 1955:

(1) *Application in Part 3 of Volume 11*

(1) *Entomobrya* Rondani, 1861 (Class Insecta, Order Collembola), validation of (pp. 75-77) (Z.N.(S.)485).

(2) *Application in Part 4 of Volume 11*

(2) *Scolopendra* Linnaeus, 1758 (Class Myriapoda), designation of a type species for, in harmony with accustomed usage (pp. 134-136) (Z.N.(S.)843).

1. Attention is also drawn to the proposed adoption of the undermentioned "Declarations":

(a) clarifying Rule (g) of Article 30 relating to the selection of the type species, in cases where a species has two or more names objectively synonymous with one another (pp. 86-89) (Z.N.(S.)878);

(b) regarding the specific name to be adopted for the type species of a genus in cases where that species possesses two or more objectively synonymous such names (pp. 112-113) (Z.N.(S.)908).

2. Any specialist who may desire to comment on any of the foregoing applications is invited to do so in writing to the Secretary to the International Commission (Address: 28 Park Village East, Regent's Park, London, N.W.1, England) as soon as possible. Every such comment should be clearly marked with the Commission's File Number as given in the present Notice.—FRANCIS HEMMING, *Secretary to the International Commission on Zoological Nomenclature.*

A NEW SPECIES OF LEPIDOSAPHES SCALE INFESTING UMBRELLA PINE IN CALIFORNIA

(Homoptera: Coccoidea: Diaspididae)

HOWARD L. MCKENZIE

California State Department of Agriculture, Sacramento

The new diaspidid scale, *Lepidosaphes sciadopitysi* McKenzie, described in this article has gone many years without the benefit of a specific name mainly because of confusion which has existed regarding the identity of North America coniferous-infesting species of this group. In California the new species is found intermixed with *Lepidosaphes maskelli* (Cockerell), (previously considered by Ferris[1] (1938) as *Lepidosaphes newsteadi* (Sulc), on the needles of Umbrella pine, *Sciadopitys verticillata.*

Correspondence (December 15, 1949) from Dr. Harold Morrison, Coccidologist of the United States Department of Agriculture, called attention to the mistaken identity of *Lepidosaphes newsteadi* infesting conifers in North America, and after his review stated: "I have no reason to believe that *Lepidosaphes newsteadi* is present in this country and expect that all records of this, including that by Ferris (Atlas II:146), will ultimately be assigned elsewhere." More recently, Balachowsky[2] (1954) presents a published account of Morrison's statements and correctly identifies the species in North America as *Lepidosaphes maskelli* (Cockerell).

The only California infestation of *Lepidosaphes sciadopitysi* on Umbrella pine is in association with *L. maskelli*, the latter being by far the most predominant species. For example, out of twenty-four specimens mounted for microscopic examination, only two of them proved to represent *L. sciadopitysi.* Morrison further indicated in his correspondence that there were two or three collections of *Lepidosaphes sciadopitysi*, in each case infesting *Sciadopitys verticillata*, from the eastern United States, these apparently not intermixed with any other species. Consequently, at the request of the author, Dr. Morrison kindly made available these various lots to be used as type material of this species. At Dr. Morrison's suggestion the holotype will be deposited in the United States Department of Agriculture collection at Washing-

[1] Ferris, 1938, Atlas of the Scale of Insects of North America, Stanford University Press, Sanford University, California, Series 2:146, illustrated.

[2] Balachowsky, 1954, Les Cocheniles Palearctiques de la Tribu des Diaspidini, Memoires Scientifiques de L'Institut Pasteur, pages 87-91, illustrated.

ton, D.C. A description of the species follows:

Lepidosaphes sciadopitysi McKenzie, new species

(Figure 1)

Suggested Common Name: Umbrella pine Lepidosaphes.

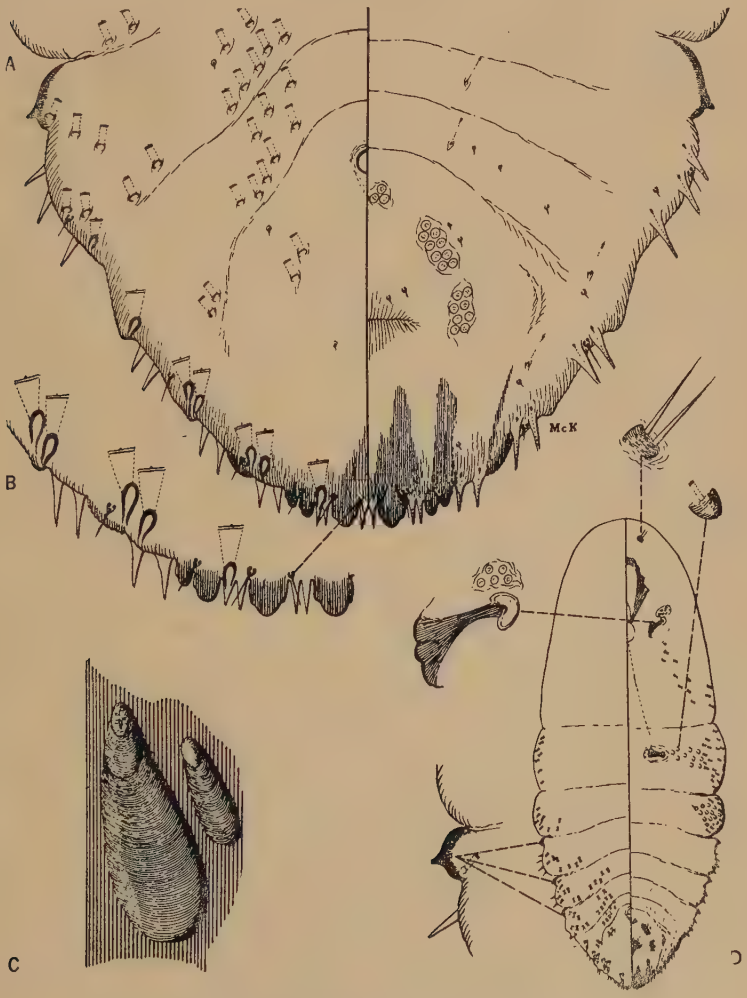
Host and Distribution: Type and paratypes from *Sciadopitys* sp. (probably *verticillata*) collected at GREENWICH, CONNECTICUT on November 10, 1908 by Charles T. Hatling. Additional paratypes are available from the same host collected at Washington, D.C. (Botanical Gardens) on November 15, 1908 by J. D. Sanders; on *Sciadopitys verticillata* at Garden City, Long Island, New York, on August 2, 1930 by J. G. Saunders; on the same host at Conshohocken, Pennsylvania on June 18, 1945 by G. B. Sleesman; and the same host at San Marino, Los Angeles County, California on October 25, 1949 by R. W. Harper.

Type Material: Type slide with four specimens, the holotype ringed with black ink, and paratypes will be deposited in the United States National Museum, Washington, D.C. Additional paratypes will be placed in the California State Department of Agriculture collection at Sacramento, California, and in the author's own collection.

Habit: Occurring on the needles. Scale of the female quite slender, averaging approximately 1.40 mm. long, brownish, exuvium terminal; male scale smaller, similar in color to that of adult female, exuvium terminal.

Recognition Characters: Length as mounted on microscope slide averages slightly less than 1 mm.; membranous at full maturity; abdominal segments but little produced laterally and with three sets of pronounced lateral sclerotized spurs (see illustration); antenna two-spined; perivulvar pores present in five groups, anterior median group ranging from 3–7, average 4.6, anterior lateral group ranging from 5–11, average 7.2, posterior lateral group ranging from 4–9, average 5.7; median pygidial lobes relatively small, low and rounded apically, once-notched on each side, second lobes bilobed, each once-notched on outer margin, remainder of pygidial margin with no distinctive features; dorsal macroducts much smaller than marginal ones of pygidium, submedian ones occurring across prepygidial abdominal segments 3–4 inclusive, and marginally only on first abdominal segment and metathorax, dorsal submedian macroduct group on sixth

segment containing usually one or two ducts on each side; fifth segment with but one or two submarginal macroducts on each side; ventral microducts and gland tubercles situated as shown on accompanying illustration.



EXPLANATION OF FIGURES

A, pygidium of adult female; B, details of the dorsal aspect of the pygidial margin; C, habit; D, body of the adult female. Unlettered details are connected to their points of origin by guide lines and should be readily identifiable. The figures were prepared by the author. They are based upon well-stained examples which emphasize the derm sclerotization.

Notes: In California, *Lepidosaphes sciadopitysi* McKenzie, is found intermixed with *L. maskelli* (Cockerell) on the needles of Umbrella pine situated in the Huntington Gardens at San Marino, Los Angeles County. This is the only known infestation of *sciadopitysi* in the State. The scale has persisted for years in spite of repeated attempts to control it by spraying.

Both *L. sciadopitysi* and *L. Maskelli* are indistinguishable externally on the needles. Microscopically, however, *sciadopitysi* differs from *maskelli* chiefly in the presence of three (3) sets of lateral abdominal spurs, these lacking in *maskelli*, and a two-spined antenna as compared to only one-spined in *maskelli*.

AN ECONOMICALLY IMPORTANT APHID NEW TO THE UNITED STATES[1]

W. D. FRONK

Wyoming Agricultural Experiment Station, Laramie

Among aphids sent F. C. Hottes, Grand Junction, Colorado, for identification were found several slides of *Myzus ascalonicus* Doncaster. These aphids were collected April 24, 1940, at Evanston, Wyoming, from onion sets sent from Detroit, Michigan. So far as is known this aphid has not previously been reported from the United States, although it has been found on chrysanthemum and carrot in Canada (MacGillivray, 1954). It was first described in England by Doncaster (1946a), who found it on shallots, onions, and other plants in storage, in the greenhouse, and in the open.

It is interesting to note that *M. ascalonicus* was first noticed in England in 1941 (Doncaster, 1946b), while the Wyoming collection was made in 1940. This aphid has been shown to be an efficient vector of several plant diseases (Doncaster 1946b), and is thus of potential importance in the United States.

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[1] Published with approval of the Director, Wyoming Agricultural Experiment Station, as Journal Paper No. 61.

DONCASTER, J. P.

1946a. The shallot aphis, *Myzus ascalonicus* sp. n. (Hemiptera, Aphidae). Proc. Roy. Ent. Soc. London (B) 15:27–31.

1946b. The shallot aphis, *Myzus ascalonicus* Doncaster, and its behavior as a vector of plant viruses. Ann. Appl. Biol. 33:66–68.

MACGILLIVRAY, M. E.

1954. Note on *Myzus ascalonicus* Doncaster (Homoptera:Aphidae) an aphid new to North America, Canadian Ent. 86:454.

MACRANCYLUS LITTORALIS (BROUN) IN CALIFORNIA, WITH A NOTE ON PHLOEOPHAGUS PROTENSUS (WOLLASTON)

(Coleoptera: Curculionidae)

Hugh B. Leech
California Academy of Sciences, San Francisco

Macrancylus littoralis (Broun)

Eutornus littoralis Broun, 1880. Manual of New Zealand Coleoptera, 1:536.
Macrancylus franciscanus Van Dyke, 1953. Pan-Pacific Entomologist, 29(2): 107–108. *New synonymy.*

Dr. Van Dyke ended the description of his new species with the statement: "Since it occurs in driftwood, it is possible that *M. franciscanus* is an introduced species."

With this in mind, in November, 1953 I sent a paratype to Sir Guy A. K. Marshall at the British Museum. He replied "On receiving your material I looked up the species described by Broun from New Zealand, because within the last 20 years two New Zealand Cossonines have established themselves in southern England. There I soon found *Macrancylus franciscanus* Van Dyke, which had been described by Broun as *Eutornus littoralis* in 1880. In 1893 Broun described two other species, *E. cylindricus* and *E. parvulus*, also from the sea-shore, which are in my opinion inseparable from *littoralis*."

Because it inhabits logs on the sea shore, *M. littoralis* is likely to spread steadily along the Pacific Coast, but is presumably not of economic importance. According to the literature, it is illustrated in the Transactions of the New Zealand Institute, vol. 41, pl. 16, fig. 12.

Phloeophagus protensus (Wollaston)

Rhyncolus protensus Wollaston, 1873. Trans. Ent. Soc. London, 1873, p. 647.
Rhyncolus protensus Wollaston, Buchanan, 1946. Bull. Brooklyn Ent. Soc., 41(4):136.

Although this species was described as from California, the first reference to it in American literature seems to be that of Buchanan.

Sir Guy Marshall writes that *P. protensus* has turned up in some numbers in Egypt. Three specimens from Alexandria, Egypt, compared by him with Wollaston's type, are before me. They most closely resemble *P. californicus* Van Dyke, but are at once distinguished from it and from all described North American

species by the widely separated front coxae. In our species the front coxae are separated by a width only slightly greater than that of an apical (claw bearing) front tarsal segment. In *P. protensus* their separation is equal to the width of a front tibia.

P. protensus has apparently not been collected in California since its description in 1873. This, coupled with its present occurence in Egypt, suggest that it is very doubtfully a North American species.

Acknowledgment. I am indebted to Sir Guy Marshall for notes, and for comparing specimens with the types.

BOOK NOTICE

FOREST ENTOMOLOGY IN HAWAII. AN ANNOTATED CHECK-LIST OF THE INSECT FAUNAS OF THE VARIOUS COMPONENTS OF THE HAWAIIAN FORESTS. By Otto H. Swezey (edited by R. H. Van Zwaluwenburg). 266 pp., 32 text figs. B. P. Bishop Museum Special Publication 44. Honolulu, August 2, 1954. Price $4.00.

The Hawaiian forest plants are listed alphabetically by their generic names (with a few cross-referenced exceptions, such as "Grasses"), and under each species the associated insects are grouped by orders and families. Each insect species has a citation to its original description; the list of References comprises pp. 231-247. The index is inclusive, but species names must be sought under the alphabetized generic names of current usage.

This list is based on the notes made by Dr. Swezey in over 40 years of rearing miscellaneous insects, with some additional data from the literature. It is full of interesting facts, and the more man's "progress" changes the endemic fauna and flora, the more will this paper be valued as a record.—HUGH B. LEECH, *Department of Entomology, California Academy of Sciences, San Francisco.*

BOOK NOTICE

THE EVOLUTION AND TAXONOMY OF THE SARCOPHAGINAE (Diptera, Sarcophagidae). By Selwyn S. Roback, Illinois Biol. Monogr., Vol. 23, Nos. 3–4, pp. v + 181, incl. 34 pls., 1 text fig., 9 charts. University of Illinois Press, Urbana; December, 1954. Price $5.00 (cloth), $4.00 (paper).

Some of the section heading are: Morphology and Terminology, Phylogeny, Biogeography, Nutritive Evolution, and Classification. This last contains a synopsis of tribes and subtribes (males) which is in the form of a key, but is said not to be a key for the identification of specimens; and a key to the genera (males only), for which the included species are listed. Seven new genera and 4 new subgenera are erected.—HUGH B. LEECH, *California Academy of Sciences, San Francisco.*

A NEW GENUS AND SPECIES OF BLIND WEEVIL FROM FLORIDA

(Coleoptera: Cossoninae)

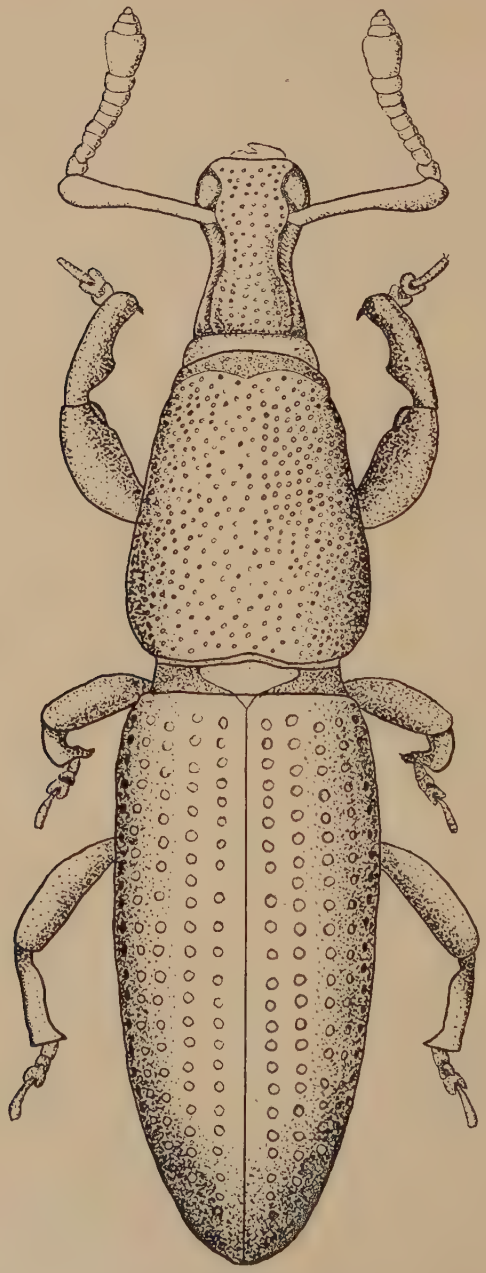
EDWARD E. GILBERT
University of California, Berkeley

In the course of a recent study of the possible phylogenetic relationships of the subfamily Raymondionyminae, the author also accumulated specimens of blind weevils in other subfamilies. Among these was a series of seven specimens from Florida, obtained from Dr. Milton B. Sanderson, Illinois Natural History Survey, which apparently represents the first blind species to be recognized in the Cossonini. Since it also appears to represent a new genus, descriptions are offered at this time.

Caecossonus Gilbert, new genus.

Body narrowly elongate, moderately compressed dorso-ventrally, levipunctate, ferruguno-testaceous, moderately convex and shining above. Head short, globular, smooth and shining; eyes absent. Beak arcuate, two times length of head, separated from head by a transverse notch; viewed dorsally, constricted at middle, widest subapically, apex truncate; viewed laterally equal in thickness throughout; viewed ventrally, with a deep elongate median concavity at middle of beak; scrobes lateral throughout, deepest at insertion, becoming shallower basally, ending as a slight concavity before basal constriction. Antannae inserted at apical third, scape elongate-clavate, almost attaining apex of prothorax, funicle clavate, eight segmented, first segment longer than wide, equal to second and third combined, second to eighth segments wider than long; club obovate, first segment glabrous and shining, greater than one half club length, second and third segments densely pubescent. Prothorax ovate, longer than wide, apically arcuate, basally sinuate, widest sub-basally. Scutellum triangulate, glabrous. Elytra subconnate, basally subtruncate, sides parallel before middle, then narrowly arcuate to apex; conjointly rounded at apex; elytral length more than two times their combined width; humeral angles not prominent.

Prosternum long, as long as meso- and metasternum combined, feebly flattened medianly; mesasternum short, one half length of metasternum; both meso- and metasternum feebly convex. Abdomen with first and second segments long, subequal, separated by a fine suture; fourth abdominal segment shorter than third; fifth segment subequal to third and fourth combined, narrowly rounded at apex. Legs short, slender; fore coxae barely, mid coxae fully separated by one half their own width, hind coxae separated by their own width. Femora strongly clavate. Tibiae slender, fore tibiae apically arcuate, with a ventral obtuse tooth at midde, and with a robust apical recurved spur; mid and hind tibiae subparallel, with smaller recurved spurs. Tarsi small, first and second segments subequal; third tarsal segment one fourth longer, wider than long; fourth tarsal segment



Caecossnus dentipes Gilbert, new species; dorsal view (X 65)

longer than third. Tarsal segments dorsally glabrous, the apical ventral surfaces with long white pubescence; claws minute, simple and free.

This genus is most closely related to *Cossonus*, and like it has the body compressed, subglabrous, the antennae inserted near the apex of the beak, the fore coxae separated by more than one-half their own width, the beak apically dilated, and more than two times the length of the head. However, *Caecossonus* differs by having the scrobes completely lateral, instead of directed ventrally, the antennae eight instead of seven segmented, the eyes absent, and the fore tibiae strongly dentate.

Caecossonus dentipes Gilbert, new species.

Body sparsely, but not uniformly, covered with minute pale yellow setae, that are arranged in a single series on the elytral intervals. Head translucent. Beak shining, sparsely and minutely punctate throughout; dorsal surface fringed apically with a row of moderately robust white setae, and with fine white setae before basal constriction, otherwise denuded; color light ferrugino-testaceous, dorsal lateral and apical borders darker, with a pair of dark dorsal semicircular lines above antennal inserton, and a median ventral stripe from the ventral concavity to the basal constriction. Antennal scape, funicle dark amber, antennal club lighter. Prothorax moderately shining, opaque, light ferrugino-testaceous, with a dark apical margin which is lateraly and ventrally bordered by a series of large dark subcontiguous punctures, dorsally the marginal dark area broadly arcuate, widest medianly. Pronotum broadly convex, wider subapically than the combined elytra, minutely and uniformly punctured, with minute setae originating from the center of each puncture. Elytra translucent, light ferrugino-testaceous with darker, more opaque punctures, that are shallow, but conspicuously larger than those of pronotum, and arranged in a single series, each puncture minutely medianly setate.

Sternum dull, apically fimbriate, sparsely punctate, the punctures subequal to those on elytra; color light ferrugino-testaceous, coxal areas darker, the fore coxal area with a triangular stripe extending dorsolaterally to pronotum, widest near coxae. Femora basally darker, shining, translucent, minutely punctate, hind femora more extensively so; apically lighter, dull, opaque, heavily punctate. Tibiae subtranslucent; fore tibiae posteriorly fimbriate from tooth to apex, apically armed with a single spur; mid and hind tibiae sparsely and uniformly setate, with a small apical lateral tooth in addition to apical spur. Abdomen dull, opaque, sparsely and minutely punctate. Length 2 mm. (excluding beak), width .6 mm.

Holotype male and allotype female (Illinois Natural History Survey, Entomology) and three female and two male paratypes. All seven specimens were taken by Drs. O. W. Richards and L. J. Stannard from ground litter in a HAMMOCK ON STOCK ISLAND, FLORIDA, December 29, 1951.

ASSOCIATION OF SEVERAL FEMALE SAWFLIES IN THE GENUS PACHYNEMATUS WITH PREVIOUSLY DESCRIBED MALES

(Hymenoptera: Tenthredinidae)

WOODROW W. MIDDLEKAUFF
University of California, Berkeley

Ross (1945) described the males of *Pachynematus miscus* from Oregon and California and *P. sporax* from Idaho, Oregon, Saskatchewan and Washington but was unable to associate females with the males. Consequently, females of the above species have never been described.

Considering the fact that several authors record members of this genus causing considerable damage to wheat, Marlatt (1896), Ross (1945) and Armitage (1954), it is felt advisable to describe the adult females. Recent collections of males with females in California now permit this association to be made.

Specimens described are in the collection of the author and the California Insect Survey.

PACHYNEMATUS MISCUS Ross

Pachynematus miscus Ross, Proc. Ent. Soc. Wash., 47:114; 1945. ♂.

Female.—Length 7.5 mm. Color black with tibiae and apices of femora dirty-white; wing membrane hyaline, veins and stigma dark brownish-black. General structure typical for genus. Saw as in figures A, and B.

Allotype, female.—Berkeley, Alameda County, California, March 31, 1954. J. W. MacSwain collector. In collection of the author.

Distribution in Californa — Alameda County, *Berkeley*, ♀, III-31-54 (J. W. MacSwain, W.W.M.); 4 ♂ ♂ III-22-54 to IV-7-54 (J. W. MacSwain, W.W.M.) Previously recorded from Corvallis, Oregon and San Francisco (Ross, 1945)

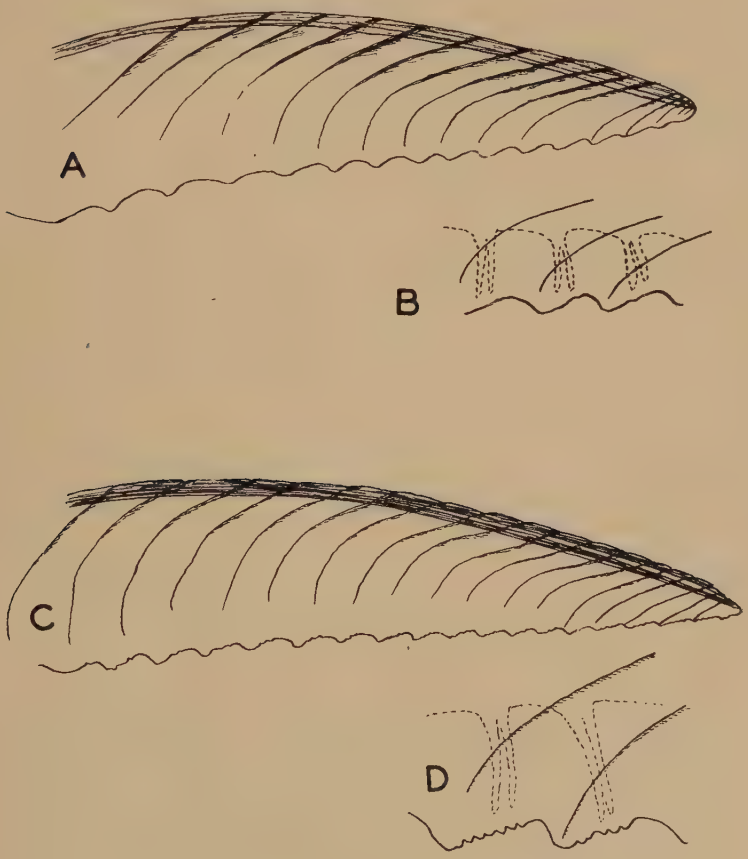
Larvae of this species remain unknown but presumably feed upon grasses as to other known members of the *extensicornis* complex. Adults were taken upon flowers of buttercup, *Ranunculus californicus* Benth.

PACHYNEMATUS SPORAX Ross

Pachynematus sporax Ross, Proc. Ent. Soc. Wash., 47(5): 114–115, ♂.

Female.—Length 6.5–7 mm. Color in general yellowish-brown and black. *Head:* yellowish-brown shading to reddish-orange dorsally. A large somewhat quadrate spot on front of head enclosing ocelli, protruding laterally towards the eyes in the antennal region and extending backwards as narrow thread-like lines in post-ocellar lateral furrows, a small area between the furrows, and antennae, black; mandibles reddish orange on apical half shading to black at apex. *Thorax:* praescutum with a large, solid U-shaped

mark, a large spot on lateral portion of scutum, a spot on midline of mesoscutellum which narrows anteriorly, post-tergite, metascutellum, cervical sclerites, basal half as well as a line on apex of mesepisternum, black. *Legs:* Base of coxae and base of femora beneath, tibiae at apex frequently and tarsi, black. *Wings:* membrane hyaline, costa, radial stem, base of medius and stigma straw-color, remainder of venation brownish-black. *Abdomen:* tergites I-VIII except narrow posterior line and saw sheath, black. Remainder of body yellowish-brown or straw-color. Saw as in figures C, and D.



EXPLANATION OF FIGURES

A, Lancet of saw of female *Pachynematus miscus* Ross; B, ventral margin enlarged; C, Lancet of saw of female *P. sporax* Ross; D, ventral margin enlarged.

Allotype, female.—California, Santa Barbara Co., *Cuyama Valley*, March 3, 1954. R. M. Hawthorne collector. On wheat. In collection of the author.

Distribution in California—Santa Barbara Co., *Cuyama Valley*, 2♀♀, III-3-54 (R. M. Hawthorne, W.W.M.); 2♂♂, III-11-54 (R. M. Hawthorne, W.W.M.); 61♀♀, IV-8-54 (H. L. Hall, W.W.M.); 14♀♀, V-15-54 (R. P. Allen, W.W.M.). All collections made on wheat. Previously recorded from Saskatchewan, Idaho, Oregon and Washington (Ross, 1945).

Larvae of this species have been causing economic damage to wheat in the Cuyama Valley since 1950 according to Mr. J. E. Swift, Extension Entomologist, University of California, who first brought them to my attention in the spring of 1953. A number of adults were secured this year as indicated in the above records. The color pattern is remarkably uniform.

REFERENCES CITED

ARMITAGE, H. M.
1954. Current insect notes. Bull. Calif. State Dept. Agric. *43*(2):73–76.

ROSS, H. H.
1945. A taxonomic outline of the Nearctic species of *Pachynematus*. Proc. Ent. Soc. Wash. *47*(5):105–120.

MARLATT, C. L.
1896. Revision of the Nematinae of North America. U.S. Dept. Agric. Div. of Ent. Tech. Ser. 3, p. 97.

BOOK NOTICES

A REVISION OF THE PSYCHODIDAE (DIPTERA) IN AMERICA NORTH OF MEXICO. By Larry W. Quate. Univ. Calif. Publ. in Ent., Vol. 10, No. 3, pp. 103-273, 105 text figs. University of California Press, Berkeley and Los Angeles; May 25, 1955. Price $2.50.

The methods devised to make adequate slide mounts of these tiny flies are given on pp. 106–107. There are idendification keys, from subfamily to subspecies level. One genus, 27 species, and 5 subspecies are described as new.

A SYSTEMATIC STUDY OF THE GENUS APHYTIS HOWARD (HYMENOPTERA, APHELINIDAE) WITH DESCRIPTIONS OF NEW SPECIES. By Harold Compere. Univ. Calif. Publ. in Ent., Vol. 10, No. 4, pp. 271–320, 19 text figs. University of California Press. Berkeley and Los Angeles; May 10, 1955. Price 75 cents.

These tiny parasites of scale insects are exceedingly difficulty to classify. In this paper the separations are chiefly on morphology, but on the basis of over 30 years of field and laboratory experience the author draws attention to many challenging problems. There are keys to 7 related genera, to 15 species, and to certain forms in each of 3 groups of species; 13 new species are described.—HUGH B. LEECH, *Department of Entomology, California Academy of Sciences, San Francisco.*

DESCRIPTION OF A NEW CRYPTOSTEMMA FROM NORTH AMERICA

(Hemiptera: Cryptostemmatidae)

P. WYGODZINSKY
University of California, Berkeley

The present paper contains the description of a new species of *Cryptostemma* collected in California by Dr. R. L. Usinger and J. D. Lattin. This genus, though apparently rather poor in species, is known from various parts of the world: Europe, Asia Minor, southern North America, Central America, the West Indies and Trinidad, northwestern Argentina and New Guinea. Only one species has thus far been reported from the U.S.A., viz., *Cryptostemma uhleri* recorded by Usinger (1945) from Georgia. It is quite possible that additional species will be found and new locality records for the known species obtained if an adequate search is made for these tiny Hemiptera in their typical habitat, *viz.*, under stones on the shores of mountain streams and other bodies of water.

Cryptostemma usingeri Wygodzinsky, new species

Color of body and appendages stramineous; pronotum brownish; fore wings slightly irridescent; abdomen somewhat darker below.

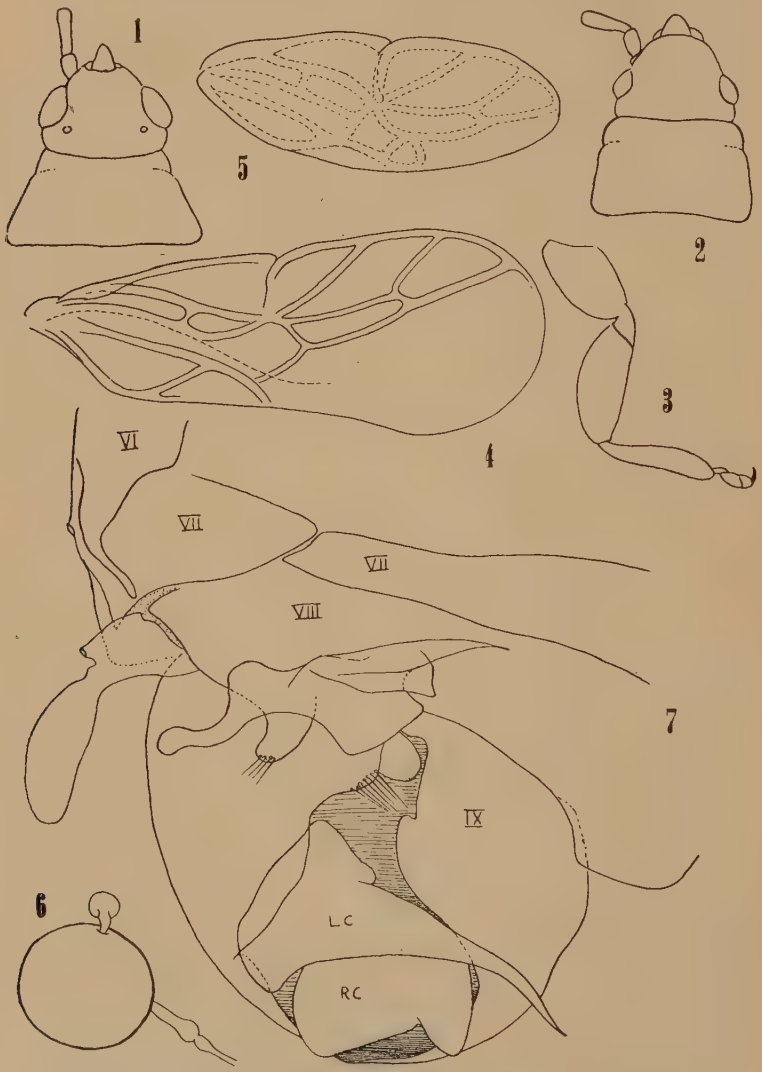
Macropterous male.—General shape subparallel. Length 1.7 mm. Head and thorax as in fig. 1; pronotum distinctly widened posteriorly. Ocelli large. Rostrum short, attaining hind border of prosternum. Second segment of antennae twice as long as first. Macrochaetae of antero-lateral angles of pronotum inconspicuous, those of postero-lateral angles distinct but short. Hind border of pronotum slightly emarginate.

Forewings as in fig. 4, surpassing slightly the apex of abdomen. Discal and apical cell separated by a transverse vein; no small cell at base of discal cell.

Fore legs incrassate, median and hind pairs more slender. Coxae simple. Spinelike setae on femora of second and third pair distinct. Tarsal formula 3:3:3. Tarsi of pairs I and II short and stout (fig. 3), of hind pair elongate; without special characters. Praetarsi of pairs I and II each with a pulvillus.

Abdomen and genitalia as in figs. 7–13. Chaetotaxy as usual. Sternites II–IX and tergites III–VIII well developed, of unequal size, asymmetrical. Spiracles present on parasternites IV–VIII. Left-hand parasternite VI prolonged into a slender, curved process (fig. 7). Tergite VII subdivided diagonally, the left-hand portion smaller than the other. Tergite VIII large; right-hand parasternite fused with tergite, left-hand parasternite free, movable, with a subelliptical projection (figs. 7, 11); hind border of tergite VIII with several backwardly directed processes (fig. 7). Hypopygium as in figs. 7, 8, 9; claspers as in figs. 7, 8, 12, 13; phallosoma as in fig. 10.

Brachypterous male.—Length 1.4 mm. Shape oval. General characters as in macropterous male. Ocelli absent. Tarsal formula 3:3:3, shape of tarsi as in macropterous male, pulvilli present on pairs I and II. Pronotum

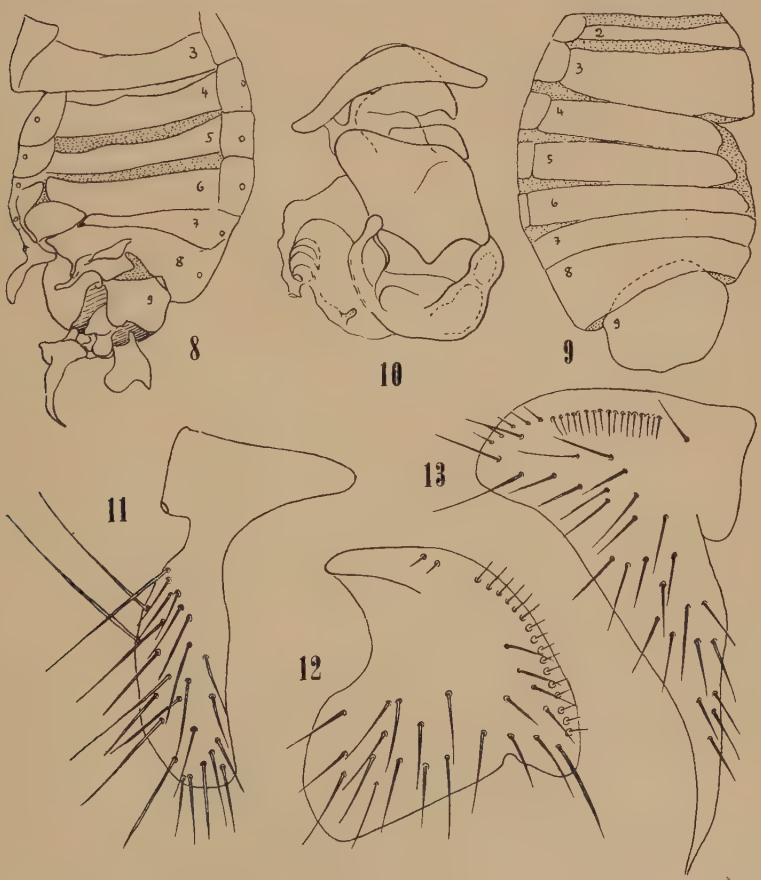


Cryptostemma usingeri Wygodzinsky. Fig. 1, head and pronotum of macropterous male; fig. 2, idem, brachypterous female; fig 3, fore leg of macropterous male; fig. 4, fore wing of macropterous male; fig. 5, fore wing of brachypterous male; fig. 6, spermatheca of female; fig. 7, genital region of male, seen from above.—Wygodzinsky del.

almost rectangular, only slightly widened posteriorly (fig. 2). Fore wings much reduced, coriaceous, not quite reaching to apex of abdomen; venation difficult to make out, as in fig 5; fracture distinct. Hind wings apparently absent. Abdomen and genitalia as in macropterous male.

Brachypterous female.—General aspect as in brachypterous male. Length 1.5 mm. Tarsal formula 2:2:3; anterior and median tarsi incrassate, though less so than in male; pulvilli absent. Fore wings as in brachypterous male, hardly surpassing half the length of abdomen. General characters of abdomen as usual; spermatheca as in fig. 6.

Fifth instar nymph.—General characters, shape, chaetotaxy of body and armature of praetarsi as described for *Cryptostemma haywardi* (Wygod-



Cryptostemma usingeri Wygodzinsky. Fig. 8, abdomen of male, dorsal view; fig. 9 idem, ventral aspect; fig 10, phallosoma; fig. 11. left-hand parasternite VIII; fig. 12, right clasper; fig. 13, left clasper.—Wygodzinsky del.

zinsky, 1952); however, with an additional small gland opening between abdominal tergites VII and VIII.

Type locality: HOT CREEK, INYO COUNTY, CALIFORNIA, 17-VII-1953, R. L. Usinger and J. D. Lattin collectors (1 macropterous male, holotype, 1 brachypterous female, allotype in collections of California Academy of Sciences, and 3 brachypterous males and 2 brachypterous females, paratypes, and 8 nymphs in the collections of R. L. Usinger, J. D. Lattin and the author).

The new species is named in honor of Dr. R. L. Usinger to whom my sincere thanks are due for allowing me to describe this interesting insect.

Most of the described species of the genus *Cryptostemma,* viz. *alienum* Herrich-Schaeffer, 1835, *birói* Wygodzinsky, 1950, *haywardi* Wygodzinsky, 1952, *pratti* Usinger, 1945, *sordida* China, 1946, and *uhleri* McAtee & Malloch, 1925, possess a distinct small cell at the base of the large discal cell of the fore wings; this small cell is not found in *usingeri* sp. n. The extremely short diagnosis of *C. smithi* McAtee & Malloch, 1925, does not mention the absence or presence of said cell, but in that species the second antennal segment is distinctly less than twice as long as the first (twice as long as the first in *usingeri*). *C. pedunculatum* McAtee & Malloch, 1925, has no small cell at the base of the discal cell, but the discal and apical cells are separated by a longitudinal vein (separated by a transverse vein in *usingeri*). *Cryptostemma (Harpago) castaneovitreus* recently described by Linnavuori (1951) differs by the distinctive venation of its fore wing. The complex male abdomen and genitalia furnish excellent additional specific characters (see Wygodzinsky 1948, 1952).

REFERENCES

LINNAVUORI, R.

1951. Studies on the family Cryptostemmatidae. Ann. Ent. Fenn. *17*(3): 92-103, 8 figs.

USINGER, R. L.

1945. Notes on the genus Cryptostemma with a new record for Georgia and a new species from Puerto Rico (Hemiptera: Cryptostemmatidae). Ent. News *56*(9): 238–241.

WYGODZINSKY, P.

1948. Contributions towards the knowledge of the genus Cryptostemma Herrich-Schaeffer, 1835 (Cryptostemmatidae, Hemiptera). Rev. Ent., Rio de Janeiro, *19*(1–2): 283–294, 51 figs.

1952. Sobre algunos Cryptostemmatidae, principalment de la Argentina (Hemiptera). Acta Zool. Lill. *10*: 51–74, 93 figs.

A PALAEARCTIC DECTICID CAPTURED IN CALIFORNIA (Orthoptera)

In a lot of California Orthoptera sent to me for study by Dr. Paul Hurd, Jr. I found a single male specimen of the circum-Mediterranean species *Platycleis tessellata* (Charpentier). The label accompanying the specimen noted its capture at Placerville on June 15, 1951 by R. O. Schuster.

In returning the specimens I asked Dr. Hurd to confirm the record of *P. tessellata*. He informs me that Mr. Schuster is quite certain of the accuracy of the data and adds the pertinent note, "Mr. Schuster, the collector, points out that since the U. S. Forest Service has brought in the majority of the world pine species to the Placerville area, it is possible that the grasshopper may have come in along with them."

It seems improbable that a single introduced specimen would be captured, but only additional search will disclose whether the species is actually established in California. This insect is a small decticid with completely developed wings. From our few long-winged native decticids it can be distinguished by its small size and a row of quadrate black spots along the discal area of the tegmina. It is unlikely that it could ever be of economic interest.—H. F. STROHECKER, *University of Miami.*

ZOOLOGICAL NOMENCLATURE: NOTICE OF PROPOSED USE OF THE PLENARY POWERS IN CERTAIN CASES FOR THE AVOIDANCE OF CONFUSION AND THE VALIDATION OF CURRENT NOMENCLATORIAL PRACTICE (A.(N.S.)22)

Notice is hereby given that the possible use by the International Commission on Zoological Nomenclature of its Plenary Powers is involved in applications relating to the under-mentioned names included in Parts 5 and 6 of Volume 11 of the Bulletin of Zoological Nomenclature, both of which Parts were published on 31st May, 1955:

(1) Applications in Part 6 of Volume 11

(1) *Scorpio* Linnaeus, 1758 (Class Arachnida), designation of *Scorpio maurus* Linnaeus, 1758, as type species of, and suppression of the name *europaeus* Linnaeus, 1758, as published in the combination *Scorpio europaeus*. (pp. 173–175) (Z.N.[S.]443).

(2) *Oxypoda* Mannerheim, 1831 (Class Insecta, Order Coleoptera), designation of *Oxypoda spectabilis* Maerkel, 1844, as type species of, to

validate current usage (pp. 176–178) (Z.N.[S.]443).

1. Notice is also given of proposals for the adoption of "Declarations":

(a) defining the expression "monotypical genus" (pp. 146–152) A.N. [S.]904).

(b) defining the combination to be attributed to the specific name for a species described as belonging to one genus but for which at the same time a second nominal genus is established conditionally (pp. 179–180 (Z.N.[S.]894).

2. Any specialist who may desire to comment on any of the foregoing applications is invited to do so in writing to the Secretary to the International Commission (Address: 28 Park Village East, Regent's Park, London, N.W.1, England) as soon as possible. Every such comment should be clearly marked with the Commission's File Number as given in the present Notice.—FRANCIS HEMMING, *Secretary to the International Commission on Zoological Nomenclature.*

BOOK NOTICE

THE CARABID BEETLES OF NEWFOUNDLAND, INCLUDING THE FRENCH ISLANDS OF ST. PIERRE AND MIQUELON. By Carl H. Lindroth. Opuscula Entomologica, Supplementum XII, 160 pp., figs. 1-42 in text, 43-58 (habitats) on un-numbered pls. at end. Lund, 1955. For sale by the Entomological Society, Zoological Institute, Lund, Sweden; price 17 Swedish crowns (about $3.50), postage extra.

This is one of the best papers yet published on North American Carabidae; it lacks keys to species, but perhaps they are not to be expected in a regional study. The taxonomy is based on over 20,000 specimens collected by Lindroth and associates during two summers in Newfoundland, plus the many other examples in the major collections of the eastern United States and Canada.

Of special note is the interpretation of the data: this has been done by a first-class taxonomist, versed in the Old World species, who has had access to, and been able to dissect for genitalia, the types of most of the species discussed. This has of course resulted in a considerable synonymy. The taxonomy, ecology, and dynamics of each species is discussed; the ecological information should set a standard for reporting on our fauna. One subgenus, three species and one subspecies are described as new.

Two other relevant works published by the same author in 1955 are: "Dejean's types of North American Carabidae" (Opuscula Ent., 20 (1):10-34), and "A revision of *Diachila* Motsch, and *Blethisa* Bon., with remarks on *Elaphrus* larvae" (Lunds Universitets Årsskrift, N.F. Avd. 2, 50(2):1-28.—HUGH B. LEECH, *Department of Entomology, California Academy of Sciences, San Francisco.*

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